logiæ primo Prælector mox Professor factus, quem honorem, nulli antea apud nos concessum, novem et triginta annos nullo intervallo retinuit, nec nisi octo abhinc annos deposuit. Primus etiam eodem fere tempore minerarum in Musæo Britannico custos creatus trium et viginti annorum labore effecit ut maxima vis minerarum omnium, nusquam alias in omni orbe terræ invenienda, intra parietes Musæi Britannici congereretur. Quod ad scientiam exquisitiorem pertinet, natura lapidum de cælo iactorum investiganda summam laudem adeptus est: idem minerarum et crystallorum formas et species accuratissime descripsit. Sed magistri boni præcipua laus in discipulis constat, neque silendum arbitror multos ex iis, qui hodie in hac scientia principes et signiferi sunt, hoc auctore et Professore doctissimo usos esse. Idem rude iam donatus a Musæo Britannico ita recessit ut rei publicæ se daret et Crickladensium suffragiis ornatus in publico totius civitatis consilio indivisi imperii vindex et defensor acerrimus sederet. Addo quod Regalis Societatis Sodalis et Collegii Wadhamensis socius honoris causa creatus cum multis virorum doctorum societatibus et in Europa et in America litterarum commercio coniunctus est.

PROF. J. LARMOR, F.R.S., has had the honorary degree of doctor of science conferred upon him by the University of Dublin.

A COMMITTEE has been formed with the object of raising a memorial in honour of the late Mr. T. G. Rooper, who died on May 20. Mr. Rooper held the office of H.M. Inspector of Schools in the Isle of Wight, Southampton and the neighbourhood during the last seven years, and both in his district and elsewhere he promoted the development of rational teaching of geography, natural history and other science studies. Information concerning the proposed memorial will be gladly supplied by Profs. F. J. C. Hearnshaw and J. F. Hudson, Hartley University College, Southampton.

THE appeal for funds for extending and modernising the scientific departments of the University of Dublin, to which reference was made last week (p. 188), should receive liberal support not only from graduates of the university, but also from all who sympathise with the cause of higher education in Ireland. Each science department of the university is in need of funds for laboratories, instruments, and other means of study and research. The university has already made considerable outlay in order to increase the efficiency of the scientific departments, but the new demands created by modern developments are too many and extensive to be met by existing resources, and it is necessary to ask for additional endowments if the university is to maintain its high position among the educational forces of the British Isles. In making the appeal for funds, it is pointed out that the important position assumed by modern science as a subject of collegiate education, and the great expansion of the scientific professions, render it incumbent on the older universities to make a costly provision for the adequate teaching of the experimental sciences. Not only must the universities of to-day be able to extend to their students—whether professional or in arts—sound theoretical and practical instruction in the established principles of science, but if these corporations are to continue to fulfil their duties efficiently, they must, in addition, provide facilities for research available both to student and teacher. In short, the demands on the resources of universities are not only for the endowment of chairs of science and the salaries of assistants and demonstrators, but also for the provision, equipment, and maintenance of lecture-rooms for teaching, and laboratories for both class-work and research. Moreover, the provision for laboratory equipment must be adequate to meet the ever-fresh demands of scientific advance. In the past the University of Dublin has discharged her duties towards the newer studies in a manner which has, in many particulars, set example to wealthier bodies. But a time has arrived when expenses must be incurred beyond her existing resources, and the University of Dublin must either obtain external aid to build and equip laboratories and lecture-rooms for physical science, electrical and mechanical engineering, botany and zoology, or conduct under grave disadvantages the instruction of those students who require to include these subjects in their professional training, or in their courses in arts.

A REPORT drawn up by a committee appointed by the Board of Trinity College, to consider the present scientific requirements of the college, shows that a sum of at least 100,000*l*. is needed by the scientific schools of the university. The appeal from which this statement of position and needs of the university has been taken is signed by Lord Rosse (Chancellor of the university), Mr. D. H. Madden (Vice-Chancellor of the university), Prof. Geo. Salmon (Provost of Trinity College), Lord Ashbourne, Lord Lansdowne, Lord Pembroke, Lord Ardilaun, Lord Iveagh, Lord Rathmore, Mr. E. H. Carson, Mr. W. E. H. Lecky, and Mr. J. H. M. Campbell. To carry the recommendations of the committee into effect, a considerable expenditure (for which no provision can be made out of college funds) must be incurred, including a capital outlay (for building and fitting laboratories and the like purposes) of 34,000*l*., in addition to an annual charge for increased salaries and other expenses, estimated at 2730*l*. per annum. Lord Iveagh has generously offered to provide the capital sum of 34,000*l*. so soon as a sufficient amount has been collected and invested to produce the annual outlay contemplated by the committee (viz. 2730*l*. per annum), and this offer will hold good for three years from May 1 next; or if a sufficient annual income is assured by investments for carrying out the recommendations of the committee for any one department, he is prepared to contribute the capital expenditure necessary for the equipment of that particular department. A very large sum has to be collected during the next three years, but Lord Iveagh's offer ought to inspire others to contribute as generously as they are able to the subscription list. The Chancellor of the university, Mr. Benjamin Williamson, and Prof. W. E. Thrift are acting as honorary treasurers of the science fund.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 14.—"On the Radiation of Helium and Mercury in a Magnetic Field." By Prof. Andrew **Gray**, F.R.S., and Walter **Stewart**, D.Sc., with Robert A. **Houstoun**, M.A., and D. B. **McQuistan**, M.A., Research Students in the University of Glasgow.

The experiments had for their object primarily to test for lines of different substances, the proportionality of the change $d\lambda$ of wave-length, for each of the components into which a single spectral line is resolved by the application of a magnetic field, to the field intensity H, and to deduce the corresponding values of the ratio e/m of charge to mass of the electron. The apparatus consisted of a set composed of a large electromagnet (built to Prof. Gray's specification), and an echelon spectroscope of twenty-six plates with auxiliary (by Hilger, London). The readings were obtained by means of a micrometer eye-piece fitted to the observing telescope. The first observations were made at right angles to the magnetic field on several of the helium lines, and on the green line of mercury. The results were used to calculate the values of $d\lambda/H\lambda^2$, and of e/m by the formula $e/m = 2\pi v . d\lambda/H\lambda^2$, where v is the velocity of light, 3×10^{10} cm. per second. In every case the normal triplet was obtained, and the separation between the extreme components found to be proportional to H up to fields of 10,000 C.G.S.; at fields above this the light becomes so faint, in all the tubes with which the authors worked, that it is impossible to obtain readings. The following table shows the results:—

Substance.	Wave-length, 10^{-8} cm.	$d\lambda/H$.	$d\lambda/H\lambda^2$.	e/m.
Helium ...	5016 (green)	$1\cdot61 \times 10^{-5}$	$6\cdot41 \times 10^{-5}$	$12\cdot1 \times 10^6$
,,	5876 (yellow)	$2\cdot07 \times 10^{-5}$	$6\cdot00 \times 10^{-5}$	$11\cdot3 \times 10^6$
,,	6678 (red)	$2\cdot90 \times 10^{-5}$	$6\cdot49 \times 10^{-5}$	$12\cdot2 \times 10^6$
Mercury...	5461 (green)	$2\cdot12 \times 10^{-5}$	$7\cdot12 \times 10^{-5}$	$13\cdot4 \times 10^6$

At a field intensity of 13,000 C.G.S. the centre component of the normal triplet was doubled, while each of the outer components was itself tripled. The polarisation of the two triplets and of the central doublet was the same as that of the lines from which they originated, namely, that of the lines of the normal triplet. At all fields up to 13,000 the faint companion to the yellow helium line D_3 was not tripled, but only doubled.

For the above lines observations were made also along the lines of force, one of the magnet cores being replaced by a core drilled from end to end with a hole about a centimetre in diameter. The following table gives the numbers obtained :—

Substance.	Wave-length, 10^{-8} cm.	$d\lambda/H$.	$d\lambda/H\lambda^2$.	e/m.
Helium	5016	$1·75 \times 10^{-5}$	$6·95 \times 10^{-5}$	$13·1 \times 10^6$
,,	5876	$2·24 \times 10^{-5}$	$6·50 \times 10^{-5}$	$12·3 \times 10^6$
,,	6678	$3·13 \times 10^{-5}$	$7·01 \times 10^{-5}$	$13·2 \times 10^6$
Mercury...	5461	$1·88 \times 10^{-5}$	$6·31 \times 10^{-5}$	$12·0 \times 10^6$

With respect to the green mercury line of wave-length 5461 tenth-metres, the authors incidentally observed fully a year ago, as they found afterwards had also been done a little earlier by Zeeman, that the line appeared to have three faint companions on the violet side, and two (they seemed at times to see three) on the red side. The companions are visible only under special conditions of the discharge tube. The values of $d\lambda$ for the first three are $-0·208$, $-0·096$, $-0·059$, and for the other two $+0·032$, $+0·067$. Though those values do not in every case agree with those given by Perot and Fabry, it is possible that, on account of hitherto unexpected complexity of the line, both sets of observations are correct.

It ought to be noticed here that Runge and Paschen have obtained a resolution of the green mercury line into three triplets in the magnetic field. This observation is entirely confirmed as to the side triplets by those of the authors (which were made before Messrs. Runge and Paschen's paper came to hand), but they have not been able to verify Runge and Paschen's result for the middle group, which appears to the authors to be a doublet. But the instrument of Runge and Paschen was a large Rowland grating of 6·5 metres diameter of circle, and the spectrum was photographed, so that their observations were, no doubt, more certain than the authors'.

May 28.—"Note on the Effect of Extreme Cold on the Emanations of Radium." By Sir William **Crookes**, F.R.S., and Prof. James **Dewar**, F.R.S.

The first endeavour was to ascertain whether the scintillations produced by radium on a sensitive blende screen were affected by cold.

A small screen of blende with a morsel of radium salt close in front was sealed in a glass tube, and a lens was adjusted in front so that the scintillations could be seen. On dipping the whole into liquid air they grew fainter and soon stopped altogether. Some doubt was felt whether this might not have been caused (1) by the presence of liquid, (2) by the screen losing sensitiveness, or (3) by the radium ceasing to emit the heavy positive ions. To test this two tubes were made, in one of which the radium salt could be cooled without the screen, and in the other the screen could be cooled while the radium salt was at the ordinary temperature.

The results were as follows :—(1) Radium salt cooled by liquid air. Screen at ordinary temperature. Scintillations quite as vigorous as with radium at the ordinary temperature. the screen and radium being *in vacuo*. (2) Radium at the ordinary temperature and screen cooled in liquid air. As the screen cooled the scintillations became fainter and at last could not be seen. On allowing the temperature to rise the scintillations recommenced. (3) A screen with a speck of radium salt in front of it was sealed in a tube. The tube was sealed off when a few fine drops of water were still remaining in the tube. The scintillations were well seen in this saturated aqueous vapour. The lower end of the tube was dipped in liquid air, which instantly condensed the aqueous vapour and left a very good vacuum. On now examining the scintillations they were if anything brighter and more vigorous than at first. When liquid hydrogen cooling was used instead of liquid air, the action was equally marked, showing that the highest vacuum that can be obtained by the action of cold does not diminish the scintillations.

In order to test the activity of radium in rendering air electrically conductive some radium bromide was sealed up in a glass tube and heated to the highest temperature the glass would stand, during the production of as high a vacuum as the mercurial pump would give. The whole tube was then immersed in liquid hydrogen contained in a vacuum vessel. On bringing the radium in such a vessel into a room in which a charged electroscope was placed it began to leak when the tube of radium surrounded with liquid hydrogen was some three feet away, and was very rapid in its action when a foot away from the electrometer. On immersing the tube containing the liquid hydrogen with submerged radium in another large vessel of liquid air and bringing the combination near the electroscope, the action was the same.

Prof. Rutherford and Mr. Soddy have made the important discovery that a condensable emanation is diffused into gases from solutions of radium salts, which is capable of condensation from the gas mixture at the temperature of liquid air. As it was important to ascertain what was taking place in this respect with the anhydrous radium bromide when isolated in the highest vacuum, the following experiment was arranged :—A glass apparatus was constructed consisting of a ∩-shaped tube having a bulb at one end, and being drawn out to a capillary tube at the other Above the bulb was a plug of hard-pressed purified asbestos. The radium salt was located at the bottom of the bulb, and the whole was most carefully heated, exhausted to the limit of the mercurial pump, and sealed off. In the dark no trace of phosphorescence could be seen in any part of the apparatus unless from the pieces of the radium bromide. The capillary tube was now immersed in liquid air in a large flask, so that distillation might proceed undisturbed for days. After twenty-four hours of this operation, on looking at the capillary tube while covered with the liquid air, a marked phosphorescence was recognisable owing to some condensed emanation. The luminosity became naturally more marked the longer the time the action was allowed to proceed, and it is the authors' intention to continue the experiments for a lengthened period of time, and then seal off the fine capillary part so that the condensed product may be thoroughly examined.

Entomological Society, June 3.—Prof. E. B. Poulton, F.R.S., president, in the chair.—Mr. G. C. **Champion** exhibited numerous specimens of *Coccinella distincta*, taken in the pine woods of Woking. They were found, as usual, running about the ground in company with *Formica rufa*, and were perhaps wanderers from some other locality. Mr. Donisthorpe said the species was still common at Weybridge in the nests of *Formica rufa*, and that he had observed it also at Bexhill, while Mr. Chitty noted its former occurrence in Blean Woods in great numbers.—Mr. H. St. J. **Donisthorpe** exhibited a very remarkable melanic form of *Halyzia 18-guttata*, L., black with white spots, the type, which was also exhibited, being light brown with white spots. The former was taken at Oxshott on May 22. He also exhibited *Stilicus fragilis*, Gr., a melanic form with a black thorax instead of red as in the type, taken at Shirley on May 15; and *Staphylinus fulvipes*, Scop., taken by himself at Bamber Forest on June 1, a new locality for this rare beetle.—Dr. T. A. **Chapman** exhibited two full-grown larvæ of *Thestor ballus*, sent by Mr. H. Powell, from Hyeres, and read a description of them in their various stages. He also exhibited a larva of *Heterogyna paradoxa*, full fed, reared from the egg at Reigate, and a cocoon of *Orgyia auro-limbata*, with parasite microgaster. The microgaster and the moth both came from the same larva, and the moth, though containing a few eggs, laid none. An imago and a parasite from the same larva have not infrequently been recorded, but there has been some doubt on the occurrence.—The **President** exhibited the dry form of *Precis actia* bred by Mr. Guy A. K. Marshall from an egg laid by a female of the wet form. The parent was captured by Mr. Marshall at Salisbury, Mashonaland (5000 feet), on February 14; the egg was laid on the following day. It hatched February 20, the larva pupated March 16, the perfect insect, a male, emerged March 28. The differences between these two forms are as astonishing as those between the two phases of *Precis antilope* bred, the dry from the wet, by Mr. Marshall last year. The president said this was the third South African species of the genus Precis in which Mr. Marshall had produced incontrovertible evidence of the specific identity of forms widely separated in colours, patterns, shape, relation of upper- to under-side, &c., and even instinct, including the selection of a particular type of country. The president also showed a small series of ants, part of a much larger collection made by the late W. J. Burchell in Brazil between the years 1825 and 1830. Considering their great age, the specimens were wonderfully well preserved, and were accompanied by remarkably exact and detailed data, and, in many cases, interesting notes on habits, instincts, &c.—Mr. O. E. **Janson** communicated a paper on the genus Theodosia and other Eastern Goliathides, with descriptions of some new species.—Colonel C. **Swinhoe** communicated a paper on new genera and species of the family Lymantriidæ in the National Collection.—Mr. G. W. **Kirkaldy** communicated a memoir on the Rhynchota collected by Dr. Arthur Willey chiefly in Berara and Lifu.—Prof. E. B. **Poulton** gave an account of experiments in 1893, 1894, and 1896 on the colour relation between certain lepidopterous larvæ and their surroundings, and especially the effect of lichen-covered bark upon *Odontopera bidentata* and *Gastropacha quercifolia*.

Mineralogical Society, June 9.—Dr. Hugo Müller, president, in the chair.—Mr. H. F. **Collins** gave an account of a remarkable mass of wollastonite with associated minerals which occurs at Santa Fé, State of Chiapas, Mexico. This mass of nearly pure wollastonite covers an area of 400 yards by 160 yards, and reaches to a depth of more than 300 feet; it is surrounded on all sides by granite, felsite, and other igneous rocks, and is separated by a mile from the nearest limestone. Near the outskirts of the mass occur extremely large crystals of wollastonite, most of which have been partially or entirely converted into quartz or semi-opal. Here are also found masses of garnet and of workable copper ores containing gold and silver. The author exhibited and described specimens of wollastonite, bornite in wollastonite, bornite in calcedony, gold-bearing linnæite, idocrase rock, and a remarkable intergrowth of bornite and galena resembling graphic granite.—Prof. H. A. **Miers** described the results he has obtained from the observation of the growth of crystals by a new method. The method consists in tracing the changes of angle upon a crystal during its growth by measuring it at intervals by means of a specially devised inverted goniometer, without moving it from the solution in which it is growing. It was found that an octahedron of alum yielded invariably three images for each face, so that the crystal had really the form of a very flat triakis-octahedron. Similar observations on other crystals lead to the conclusion that the faces of a crystal are in general not faces with simple indices, but vicinal planes slightly inclined to them, which change their inclination during the growth of the crystal. By determinations of the refractive index of the solution by means of total reflection within the crystal, it was found that in each case the liquid in contact with the growing crystal is slightly supersaturated.

Mathematical Society, June 11.—Prof. H. Lamb, president, in the chair.—The president announced that, after the conclusion of the current volume, some changes would be made in the form of publication of the *Proceedings*, the chief being an increase in the size of page and type.—The following papers were communicated:—Major P. A. **MacMahon,** The application of quaternions to the algebra of invariants.—Mr. G. B. **Mathews,** Jacobi's construction for quadric surfaces.—Mr. H. W. **Richmond,** Automorphic functions in relation to the general theory of algebraic curves. The object of the paper is to extend to curves in space of three or more dimensions the methods which have been developed by Poincaré and Humbert for the parametric representation of plane curves by means of automorphic functions. Curves are classified by their genus (or deficiency), their order and the number of dimensions of the space in which they lie, and the properties of all the curves in a class can be inferred from those of particular members of the class. The genera 1, 2, 3, 4, 5 are discussed in detail.—Prof. L. E. **Dickson,** Addition to the paper on four known simple groups of order 25920.—Prof. A. C. **Dixon** made an informal communication On a method of introducing the logarithmic function by means of geometrical properties of conics.

Edinburgh.

Royal Society, June 1.—Dr. Munro in the chair.—Mr. George **Muirhead**, commissioner for the Duke of Richmond and Gordon, read a paper on the effect of temperature on the taking of salmon by rod and fly on the River Spey at Gordon Castle. From a careful examination of the full statistics which had been kept for a number of years, and a discussion of them in the light of various possible meteorological and climatic causes, the conclusion come to was that the number of salmon caught on a day was determined, to a large extent, by the variation of temperature during that day, the greater the variation of temperature the smaller the catch.—Dr. W. **Peddie** read a paper on the theory of colour vision. The theories which give the best account of the facts of colour vision and colour blindness are the Young-Helmholtz theory and Hering's theory. Both are trichromatic theories, and, apart from physiological or anatomical questions, both can, by proper choice of fundamentals, be made to give a good account of the main facts. The facts of one-eyed colour blindness show that, on the Young-Helmholtz theory, colour blindness must be regarded as due to fusion of at least two fundamental sensations. But the curves of one sensation, determined by observations on different eyes, differ considerably among themselves. This indicates that a broader basis for the theory may be desirable. This may be sought for in a tetrachromatic theory. But any such theory must explain the possibility of trichromatic representation of all colours. The theory proposed assumes two pairs of complementary stimulations, say, R,G_1 and G_2,V. In this respect it has a resemblance to Hering's theory. But whereas, in Hering's theory, stimulation of one member of a complementary pair means no stimulation of the other member, in the proposed theory equal stimulations of two such members gives white. It is shown that four sets of equivalent trichromatic fundamentals must exist. Assuming Helmholtz's fundamentals as such a set, the four mathematically possible sets of tetrachromatic equivalents, of which only one can exist physically, are deduced; and it is found that one of these does suit the known facts of colour vision and colour blindness. Choosing this set, the other three trichromatic equivalent sets (Helmholtz's being the fourth) can be deduced. The perceptibility curves (ordinates being differences of wave-length just appreciable to the eye in the spectrum) found for one of these sets is compared with that given by Helmholtz's set. The comparison is found to be very satisfactory. The nature of the tetrachromatic set shows that colour blindness must be regarded as due to suppression of one complementary pair of sensations, while variations in normal eyes are due to partial suppression. In this way the sensation curves for different eyes may have greater fixity as regards form, depending on wave-length, than in the trichromatic set. This result is desirable if the sensation curves are to be regarded as really corresponding to physiological stimulation produced photochemically or photoelectrically. A simple theory of such stimulation is given and shown to lead to the required form of relation between the four fundamentals.

June 15.—The Hon. Lord M'Laren in the chair.—Dr. **Horne** and Dr. **Peach** read a paper on the Canonbie Coalfield: its geological structure, &c. Though of limited extent, this coalfield has aroused considerable interest owing to the important series of plants obtained from the beds and to the questions bearing on the correlation of the Carboniferous rocks of the Scottish border with those of the north of England and centre of Scotland. About twenty years ago it was assigned by the Geological Survey to the Calciferous Sandstone series. At that time, however, great difficulty was felt in correlating the subdivisions of the Carboniferous rocks as there developed with those in the midland valley of Scotland, owing to the marked variation in some of the groups from the normal Scottish types. The palæontological evidence then obtained was not in accord with these conclusions, for the plants seemed to show that the coalfield really belonged to the true Coal-measures. Last year the Canonbie area was reexamined by the Geological Survey and Mr. Kidston. Deep bores have been sunk in recent years by His Grace the Duke of Buccleuch, and these also have furnished important geological evidence. By means of horizontal sections it was shown that the following order of succession prevailed in the Lower Carboniferous rocks of that region:—(1) at the base, the Whita Sandstone resting on the Birrenswark volcanic platform; (2) the cement stone group; (3) the Fell Sandstones; (4) the Glencartholm volcanic group with Scorpion Bed; (5) a group of marine limestones, sandstones, and shales, with coal seams on two horizons—a lower, the Lawston Linn and Muirburn coals (Scremerston position), and an upper, the Kilnholm coals (Lickar position). The Upper Carboniferous Rocks of that region, embracing the Canonbie Coalfield, have been referred by Mr. Kidston to the Lower, Middle, and Upper Coal-measures, in virtue of the evidence obtained from the plants. The bores sunk in recent years near Rowanburn prove that the Rowanburn coals (Lower Coal-measures) overlie the marine limestone group with the Kilnholm (Lickar) coals; and that, further, the Red Sandstones and shales referred by Mr. Kidston to the Upper Coal-measures pass downwards into a series of thin coals which may be the upper part of the Byreburn series. An important economic question arises as to the extension of this coalfield, for it appears that there is good ground for the belief that the sandstones and shales of the Upper Coal-measure age overlie the Middle and Lower Coal-measures. In conclusion, it was shown by means of vertical sections that the Carboniferous succession in Eskdale and Liddesdale resembles more closely that of Northumberland than that of central Scotland.—As an important supplement to the foregoing, Mr. Kidston communicated lists of the fossil plants of the Calciferous Sandstone series of Dunfermline, of the Carboniferous Limestone of Eskdale, of the Lower Coal-measures of Canonbie, of the Middle Coal-measures of Byreburn, and of the Upper Coal-measures of Jockie's Syke, Cumberland, which borders on Dumfriesshire. Tables showing the horizontal distribution of the species were given, and some new and interesting species described, among these a new species of Pinakodendron (*P. Macconochiei*) being the first record of the genus in Britain.—A paper by Prof. **Ewart** on the wild horse will be printed in full in these columns.

DUBLIN.

Royal Dublin Society, May 19.—Prof. W. F. Barrett, F.R.S., in the chair.—Prof. T. **Johnson** gave an illustrated account of a tylose which he had found in a tracheide in the xylem of the rhizome of a bracken fern (*Pteris aquilina*, L.). He suggested that the disturbance in the transpiration current resulting from cutting the bracken might produce tyloses in the underground stem.—Mr. Richard J. **Moss** read a paper on an Irish specimen of dopplerite. This interesting substance does not seem to have been previously recorded as occurring in the United Kingdom, though it would appear from a reference to a peculiar form of peat in a report issued by the Commission on Bogs in Ireland in 1811 that the substance named dopplerite by Haidinger in 1849 had previously been observed in Ireland. The dopplerite recently found in a peat bog in the county of Antrim was in the form of an elastic jelly, velvety-black in colour, and drying to a solid of jet-like appearance, with a bright conchoidal fracture. In chemical composition it differs little from the peat in which it was found. It is shown that mineral matter, chiefly iron oxide and lime, which constitutes 5 per cent. of the dry substance, may be removed by steeping the jelly in hydrochloric acid without altering the consistence or appearance of the substance. The original jelly is acid to litmus, and liberates carbon dioxide from calcium carbonate. Assuming that it consists chiefly of monobasic humic acid with a molecular weight of 350, the gas liberated corresponds to 73 per cent. of humic acid in the dry substance. The peat in which the dopplerite was found liberates carbon dioxide corresponding to 60 per cent. of the dry substance.—Prof. W. F. **Barrett** exhibited and described Hilger's direct-reading wave-length spectroscope.—Prof. E. J. **McWeeney** gave a description of *Streptothrix nigra*, an organism occurring in soil, and producing a bright brown pigmentation of the nutrient medium.

Royal Irish Academy, May 25.—Prof. R. Atkinson, president, in the chair.—Reports were presented by Dr. R. F. **Scharff,** R. L. **Praeger,** Prof. G. A. J. **Cole,** Prof. D. J. **Cunningham,** F.R.S., G. **Coffey** and others on the results obtained during their exploration of the Kesh Caves, Co. Sligo. The reports detailed the results obtained from an exploration of the deposits of clay, rock-fragments, and stalagmite found in the caves situated on the slopes of Keishcorran Mountain in Co. Sligo. Several weeks were spent by the committee in excavating these caves in 1901. The zoological results possess many points of interest. The brown bear was found to have inhabited these caves in great numbers in former times; in Ireland remains of this animal have hitherto been found only very locally. The other animals found in the caves which are now extinct in the country in either a wild or domesticated state were the reindeer, wolf, and Arctic lemming, the last of which is an addition to the Irish fossil fauna. Man was chiefly a late inhabitant of the caves, a single polished axe being the only Neolithic object found. Several implements of crannog type were found, and abundance of charcoal.

June 8.—Prof. R. Atkinson, president, in the chair.—The intrusive gneiss of Tirerrill and Drumahair, by Prof. Grenville A. J. **Cole.** The northern end of the gneissic axis of the Ox Mountains consists of an intrusive granite, which contains blocks of amphibolite, derived from an earlier series. The banded phenomena presented by it are connected with its flow, and the contrasts of mineral constitution in the bands are connected with the abundance of basic inclusions, which have become streaked out in the fluidal mass. Though brought into their present prominence by Caledonian and Hercynian movements, the crystalline rocks of the chain may still be of Archæan age, as originally suggested by Prof. Hull.

PARIS.

Academy of Sciences, June 22.—M. Albert Gaudry in the chair.—Two fluid batteries; electromotive force, condensations, transformations of energy at the electrodes, by M. **Berthelot.**—On the structure and history of the lunar crust. Observations suggested by the seventh number of the photographic atlas of the moon, by MM. **Lœwy** and P. **Puiseux.** This volume contains photographs which show clearly the frequent distribution of the eruptive orifices along the lines of cleavage. From the mode of diffusion of the scoriæ there would appear to have been, at a remote period, an atmosphere, and from the state of these deposits it is clear that there can be no running water on the surface.—On the loss, in time of drought, of a spring fed by infiltration of a sheet of water, by M. J. **Boussinesq.**—On a property of the α-rays of radium, by M. Henri **Becquerel.** If the α-rays, placed in a field of magnetic intensity H, have a real or fictitious mass *m*, carrying an electric charge *e*, they ought to describe a circular trajectory of radius R, with a velocity *v*, and the relation $RH = vm/c$ ought to hold between these quantities. From this RH ought to be a fixed quantity for the α-rays, but this is not the case, since Prof. Rutherford has given $RH = 3{\cdot}9 \times 10^5$, and in the experiments now described values of RH, varying continuously between $2{\cdot}91 \times 10^5$ and $3{\cdot}41 \times 10^5$, have been obtained. From this it follows that in a uniform magnetic field the radius of curvature of the trajectory of the α-rays deviated by the field increases with the length of the trajectory, and this may be attributed to the presence of air.—The preparation of carbides and acetylene acetylides by the action of acetylene gas upon the hydrides of the alkalis and the alkaline earths, by M. Henri **Moissan.** At a temperature of 100° C. the hydrides of the alkalis and the alkaline earths react with acetylene, liberating hydrogen and giving compounds of the type $C_2K_2.C_2H_2$ and $C_2Ca.C_2H_2$. These compounds, heated in a vacuum, dissociate readily into acetylene and the corresponding carbide, and hence form a new method for the preparation of the carbides at a low temperature. Neither methane nor ethylene react at 100° C. with these hydrides.—The influence of the solvent on the rotatory power of certain molecules, by MM. A. **Haller** and J. **Minguin.** Details are given of experiments on several camphor derivatives. In solution in benzene and its homologues, which are non-ionising liquids, the rotatory power of cyano-camphor was found to be nearly zero, whilst in other solvents, especially in alkaline liquids, which are strongly ionising, the rotatory power was very high. Other camphor derivatives showed similar results, although the differences were less marked.—The differences between the diseases known as nagana, surra, and caderas, by MM. A. **Laveran** and F. **Mesnil.** It has been previously shown that the nagana or disease of the tsetse fly and caderas, prevalent in South America, are distinct diseases, and a comparison of the Trypanosoma from the disease known as the surra with the two preceding shows that this is quite different from either. The three diseases are hence quite distinct.—The international congress of savants at the Universal Exhibition of St. Louis, 1904, by M. **Newcomb.** This congress will be held on September 19, 1904, and the five following days. A short account is given of its objects and the arrangements that have been made.—The drawings on the walls of the cave of Altamira (Spain), by MM. Émile **Cartailhac** and the Abbé H. **Breuil.** A comparison is made between these drawings and those recently described in the French caves. The style of work and colouring is similar in both, but in the Spanish cave the colouring is much superior to that in the French caves; it is noticeable that in the former drawings of the mammoth and reindeer are absent.—Remarks by M. Salomon **Reinach** on the preceding memoir. It is noteworthy that only animals which could be used for food are depicted in these caves, there being no representations of carnivora. The Aborigines of Central Australia also draw figures of animals on the rocks and soil, with the object of increasing their multiplication, and here, also, carnivora are naturally absent.—The propagation of waves in elastic media, according as the media are conductors or non-conductors of heat, by M. P. **Duhem.**—The perpetual secretary announced to the Academy the death of M. L. Cremona, correspondant for the section of geometry.—On surfaces which may, in several movements, give rise to a family of Lamé, by M. A. **Demoulin.**—On the simultaneous employment of the laws of distinct survival, by M. Albert **Quiquet.**—On a method of measuring the variation of the current in the armature in short circuit during the time of commutation in a continuous current dynamo, by M. **Iliovici.**—On the physical constitution of the atmosphere, by M. Louis **Maillard.** The usual formula for the density $\rho=273/760\ p/T$ does not appear to hold when p and T are both very small. From the author's calculations, which are partly based on results from captive balloons and partly on laboratory experiments, the density of the air diminishes up to a height of 30 to 50 kilometres, and then increases up to 75 kilometres ($\rho=0{\cdot}21$). If these results are correct, the theories of astronomical refraction will require some modifications.—On the estimation of vanadium in alloys, by M. Paul **Nicolardot.** The method of Sefström (the solution of the alloy in sulphuric or hydrochloric acid) for the qualitative detection of vanadium in Swedish iron, when slightly modified, can be made quantitative. Comparative analyses of the same sample by three methods are given.—On the esterification of the hydracids, by M. A. **Villiers.**—On the benzoyl derivatives of hydrazobenzene, by M. P. **Freundler.**—On the action of abietic acid on ferments, by M. Jean **Effront.**—On some combinations of chloride of gold and pyridine, by M. Maurice **François.**—The phenyl substitution in the phenylmethanes, their carbinols and chlorides, by M. Jules **Schmidlin.** A thermochemical paper.—The preparation of alkyl nitrates and nitrites, by MM. L. **Bouveault** and A. **Wahl.** Excellent yield of nitric esters can be obtained by the use of anhydrous nitric acid in the case of the primary alcohols; with secondary alcohols the action is quite different, the corresponding ketone being the main product of the reaction; with tertiary alcohols the action is destructive. The action of pure HNO_3 is suggested as a reagent for differentiating between the three classes of alcohols. Excellent yields of nitrous esters were obtained by the action of nitrosyl chloride upon a mixture of the alcohol and pyridine at 0° C.—Chlorine derivatives of methylene chloroacetate and diacetate, by M. Marcel **Descudé.**—On some new members of the pyranic series, by MM. R. **Fosse** and A. **Robyn.**—On stachyose, by M. C. **Tanret.** It is shown that manneotetrose and stachyose are identical, the composition being $C_{24}H_{42}O_{21}$.—Comparisons between the phenomena of nutrition in seedlings with or without their cotyledons, by M. G. **André.**—On some conditions of oxidation of salicylic aldehyde by organs and extracts of organs, by MM. J.-E. **Abelous** and J. **Aloy.** The oxidation of salicylic aldehyde in extracts from the liver of the horse or calf goes on better in a vacuum than in air, the presence of free oxygen diminishing, or even suppressing, the oxidation.—On the glycerol in the blood, by M. Maurice **Nicloux.**—On mixtures of iodine and sulphur, by M. R. **Boulouch.** From a dilatometric study it would appear that sulphur and iodine when fused together give rise to neither definite compounds nor solid solutions.—The action of the magnetic field on the infusoria, by MM. C. **Chéneveau** and G. **Bohn.** Contrary to the results obtained by M. H. du Bois, it is found that an intense magnetic field modifies the ciliary movements, the growth, and the multiplication of the infusoria.—The law of the action of trypsin on gelatin, by MM. Victor **Henri** and Larguier **des Bancels.**—The family of the Clostridiaceæ, by M. Paul **Vuillemin.**—On the structure of the seed of *Nymphaea flava*, by M. J. **Chifflot.**—The disease of the plane tree, by M. J. **Beauverie.**—On the exotic plant species in the immediate neighbourhood of Béziers (Hérault), by M. P. **Carles.**—On the geology of the Oubangui district at Tchad, by M. **Lacoin.**—The poisons of the organism and gestation, by MM. **Charrin** and **Roché.**—The results of phototherapy and the technique of its application in lupus, by M. **Finsen.** Statistics of the results obtained in the treatment of lupus at the Finsen Institute, Copenhagen, with some details of the mode of treatment.

DIARY OF SOCIETIES.

FRIDAY, JULY 3.

INSTITUTION OF MINING ENGINEERS, at 11.30 a.m.—Further Remarks on the Portuguese Manica Gold-field: A. R. Sawyer.—Coal fields of the Faröe Islands: E. A. Greener.—Miners' Anæmia or Ankylostomiasis: Dr. J S. Haldane.—Water-softening Plant: Vincent Corbett.—The Redevelopment of the Slate-trade in Ireland: O. H. Kinahan.—The Smelters of British Columbia: W. Denham Verschoyle.—The Common-sense Doctrine of Furnace-draught: H. W. Halbaum.—The Ventilation of Deep Mines: Arthur C. Murray.

GEOLOGISTS' ASSOCIATION, at 8.—Some Flint Implements from Reading and Maidenhead: Ll. Treacher.

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